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REVISED DRAFT ENVIRONMENTAL ASSESSMENT

SAND TRANSFER PLANT REHABILITATION AND ADDITION OF SECOND DISCHARGE POINT AND PERMANENT BOOSTER PUMP

LAKE WORTH INLET PALM BEACH COUNTY, FLORIDA



**U.S. Army Corps
of Engineers**
JACKSONVILLE
DISTRICT

REVISED DRAFT ENVIRONMENTAL ASSESSMENT ON SAND TRANSFER PLANT REHABILITATION AND ADDITION OF SECOND DISCHARGE POINT AND PERMANENT BOOSTER PUMP LAKE WORTH INLET PALM BEACH COUNTY, FLORIDA

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ON
SAND TRANSFER PLANT REHABILITATION AND ADDITION OF
SECOND DISCHARGE POINT AND PERMANENT BOOSTER PUMP
LAKE WORTH INLET
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1 PROJECT PURPOSE AND NEED

1.1 PROJECT DESCRIPTION

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is proposing to rehabilitate the sand transfer plant (STP) located immediately north of Lake Worth Inlet, Palm Beach County, Florida (see Figure 1, Site Map). Rehabilitation measures would include the eventual replacement of the existing diesel motor with a quieter, more efficient electric motor. Operation of the STP is not expected to significantly change after rehabilitation, e.g. the plant would continue to operate 24 hours a day, 7 days a week, at different times of the year. Bypassed material would also continue to be placed on the beach south of the inlet, from the south jetty going south for approximately 3,100 feet (DEP Monuments R-76 to R-79). The amount of sandy material annually bypassed has averaged 163,875 cubic yards between 1996 and 2005. The existing discharge point, located 200 feet south of the south jetty, would remain. However, a second additional discharge point is being proposed and would be installed 2,500 feet south of the existing discharge point. Pipeline installation to the second discharge location is expected to be performed by directionally boring under any existing cap rock layer, which would place the pipeline 20 feet or more in depth from the surface. A permanent booster pump would be required to move material all the way to the second discharge point. The housing structure for the pump would be constructed adjacent to the south jetty and within the 80-foot Federal easement. It would be approximately 20 feet in width and 40 feet in length. The booster pump would have an electric motor with a decibel level not exceeding local code requirements (55 dBA). The housing would not have external lights.

1.2 PROJECT NEED OR OPPORTUNITY

Sand is pumped by the STP from north of the inlet to a discharge point south of the southern jetty via a pipeline underneath the inlet. This action reduces shoaling of the inlet or entrance channel to Palm Beach Harbor. It also mimics the natural littoral drift process without impeding navigation while at the same time providing shore protection benefits. The STP design is outdated, however, and plant capacity is insufficient to pass the necessary volumes of sand at an adequate distance south



of the inlet. Currently, the existing plant places sand too close to the south jetty, and the material is moved by hydraulic forces and wave refraction back towards the inlet. The second discharge point should alleviate this problem, as well as provide for more efficient distribution of sand across the entire beach placement area.

1.3 PROJECT AUTHORITY

The Public Works Act (PWA) Program of 13 March 1934 (House Document 185/73/2) authorized the maintenance of improvements previously constructed by local interests at Palm Beach Harbor. Section 101(b) (8) of the Water Resources Development Act (WRDA) of 1996 authorized a project for mitigation of shoreline erosion and storm damages caused by existing federal navigation improvements.

1.4 PROJECT OBJECTIVES

- Rehabilitate the sand transfer plant in order to improve and maximize its bypass capacity.
- Construct an additional outfall so that bypassed sand can be spread more efficiently across the beach placement area, and at an adequate distance from the inlet.

1.5 RELATED ENVIRONMENTAL DOCUMENTS

The following is a list of related documents:

1. Environmental Assessment, Sand Transfer Plant Rehabilitation and Extended Outfall, Palm Beach Harbor-Lake Worth Inlet, Palm Beach County, Florida. U.S. Army Corps of Engineers, Jacksonville District, May 2004.
2. Environmental Impact Statement, Coast of Florida Erosion and Storm Effects Study Region III, Palm Beach, Broward and Dade Counties, Florida. U.S. Army Corps of Engineers, Jacksonville District, October 1996.
3. Environmental Assessment, Maintenance Dredging, Palm Beach Harbor, Palm Beach County, Florida. U.S. Army Corps of Engineers, Jacksonville District, 1998.
4. Draft Environmental Assessment, Section 107 Small Navigation Project, Palm Beach Harbor-Lake Worth Access Channel Expansion, Palm Beach County, Florida. U.S. Army Corps of Engineers, Jacksonville District, 2001.

1.6 DECISIONS TO BE MADE

This Environmental Assessment evaluated impacts to local resources caused by the proposed action and recommends protective measures that would best minimize those impacts.

1.7 SCOPING AND ISSUES

1.7.1 ISSUES EVALUATED IN DETAIL

The following issues were identified to be relevant to the project and appropriate for detailed evaluation: (1) Federally protected species occurring or potentially occurring

within the project area (i.e., sea turtles, West Indian manatee); (2) shoreline stability; (3) Essential Fish Habitat concerns; (4) migratory bird protection; (5) impacts to vegetation (native plant communities); (6) water quality degradation, specifically turbidity levels; (7) potential presence or release of hazardous, toxic, or radioactive waste (HTRW); (8) impacts to navigation (9) socio-economic impacts; (10) enhancement or denigration of cultural resources; (11) recreation; (12) modification of local aesthetic qualities; and (13) noise.

1.7.2 ISSUES ELIMINATED FROM DETAILED ANALYSIS

The following issues were not considered relevant to the proposed action: (1) areas where STP activities would occur do not have submerged or emergent aquatic vegetation (i.e. seagrasses, mangroves, saltmarsh); (2) the proposed action is expected to have little or no impact on air quality, soils, housing, or population dynamics.

1.8 ENVIRONMENTAL COORDINATION

1.8.1 WATER QUALITY CERTIFICATION

This project would be performed in compliance with state of Florida water quality standards. The local sponsor has agreed to obtain the necessary permit from the Florida Department of Environmental Protection (DEP). The DEP by letter dated September 22, 2003, has stated that they do not object to the planned STP rehabilitation and outfall extension. In accordance with the Coastal Zone Management Act, the proposed maintenance would also be reviewed by the State in order to determine if the project is consistent with the Coastal Zone Management Plan. This review is performed concurrently with the issuance of the State permit.

1.8.2 ENDANGERED SPECIES ACT- SECTION 7 COORDINATION

In accordance with Section 7 of the Endangered Species Act, consultation with the U.S. Fish and Wildlife Service has been initiated.

2 ALTERNATIVES

The alternatives section is perhaps the most important component of this EA. It describes the no-action alternative, the proposed action, and other reasonable alternatives that were studied in detail. The beneficial and adverse environmental effects of the alternatives are presented in comparative form, providing a clear basis for choice to the decisionmaker and the public. A preferred alternative was selected based on the information and analysis presented in the sections on the Affected Environment and Probable Impacts.

2.1 DESCRIPTION OF ALTERNATIVES

2.1.1 ALTERNATIVE 1: NO-ACTION (WITHOUT PROJECT)

The STP would not be rehabilitated and the second discharge point and permanent booster pump would not be constructed. Without rehabilitation, the STP is expected to be able to operate for an additional 7 years or until 2013. Quantities of sandy material currently being bypassed would remain the same. This material would continue to migrate back towards the inlet due to wave refraction and local hydraulic forces. Annual maintenance dredging of the settling basin adjacent to the STP, as well as Lake Worth Inlet, would continue.

2.1.2 ALTERNATIVE 2: REHABILITATE SAND TRANSFER PLANT AND CONSTRUCT SECOND DISCHARGE POINT AND PERMANENT BOOSTER PUMP

The STP would be rehabilitated in order to maximize its bypass potential. A second additional discharge point would be installed 2,500 feet south of the existing discharge point. The location of the second discharge point would be beyond the inlet's nodal point, or the point at which sand would not migrate back towards the inlet. It would also allow for more efficient distribution of sand along the entire beach placement area. A permanent booster pump would be necessary in order to move bypassed material to the second discharge location.

2.1.3 ALTERNATIVE 3: CONSTRUCT SECOND DISCHARGE POINT (WITHOUT REHABILITATION OF SAND TRANSFER PLANT).

This alternative would construct a second discharge point 1,000 feet from the south jetty. Rehabilitation or improvements to the existing STP would not be performed. Upon further evaluation, this alternative would not adequately satisfy the objective of preventing sand from returning to the inlet, as it is estimated to be 1,500 feet north of the nodal point. Rehabilitation of the STP is also considered necessary in order to maximize its bypass potential.

2.1.4 ALTERNATIVE 4: NEW SAND TRANSFER PLANT.

A totally new STP would be constructed with a bypass capacity of approximately 160,000 cubic yards per year. Discharge points located 750, 1,250, and 1,750 feet

along the beach south of the south jetty were also evaluated. However, the sand impoundment capability is assumed to be the same as that of a rehabilitated STP with a 2,500-foot outfall extension. Replacing the existing STP with a new STP is not economically viable as rehabilitation is considerably less expensive and provides sufficient bypass capacity.

2.2 ISSUES AND BASIS FOR CHOICE

The proposed action has substantial support from local, regional, and state interests. There is some concern regarding construction of the pipeline extension with respect to nesting sea turtles. In order to avoid adverse impacts to this resource, construction of the pipeline would be performed outside the primary sea turtle nesting season.

2.3 PREFERRED ALTERNATIVE(S)

Alternative 2, rehabilitation of the sand transfer plant with a second discharge point, 2,500 feet south of the existing discharge location, and a permanent booster pump would best meet the project's objectives. This alternative delivers the highest benefit to cost ratio and can be accomplished with acceptable environmental impacts, if certain protective measures are implemented. This action is referred to in Table 1 and Section 4.0 as the Selected Plan.

2.4 ALTERNATIVES ELIMINATED FROM DETAILED ANALYSIS

Based on the benefit to cost ratio and engineering criteria, Alternatives 3 and 4 were eliminated from detailed analysis.

2.5 COMPARISON OF ALTERNATIVES

Table 1 lists alternatives considered and summarizes the major features and consequences of the proposed action and alternatives. See Section 4.0, Environmental Effects, for a more detailed discussion of impacts of alternatives.

Table 1: Summary of Direct and Indirect Impacts

ENVIRONMENTAL FACTOR	Alternative 1: No Action Status Quo	Selected Plan Alternative 2: Rehabilitate Sand Transfer Plant, Construct Second Discharge Point and Permanent Booster Pump
SEA TURTLES	Bypassing events, maintenance dredging, and beach placement would continue. No additional impacts to sea turtle nesting.	Construction may affect nesting sea turtles. Nests would be monitored and relocated if necessary. Maintenance dredging and beach placement rates may slightly decline.
WEST INDIAN MANATEE	Current rate of maintenance dredging would continue. No additional impacts to manatees.	Construction unlikely to adversely affect manatees with implementation of standard protection conditions. Future maintenance dredging may be slightly reduced.
SHORELINE STABILITY	Current rates of erosion, shoaling, bypassing, and maintenance dredging may continue.	Shore protection benefits in placement area. Discharge of material south of the nodal point is expected to minimize material returning to the inlet area.
ESSENTIAL FISH HABITAT	Current rate of maintenance dredging would continue.	No substantial adverse impact. Future maintenance dredging may be slightly reduced.
MIGRATORY BIRDS	No effect.	No adverse effects are anticipated. If required, migratory bird protection plan would be implemented.
VEGETATION	No effect.	No adverse effects are anticipated.
WATER QUALITY	Maintenance dredging and beach placement rates would remain the same.	No effect anticipated. If necessary, turbidity monitoring shall be performed. Future inlet dredging maybe reduced.
HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE	No effect.	No effect anticipated.
NAVIGATION	Slightly increased risk to vessels due to increased shoaling of entrance channel.	Minor long-term benefit to deep draft vessels. Slightly reduced shoaling of inlet.
ECONOMICS	Minor long-term adverse impact due to shoaling. Slightly increased dredging costs.	Shore protection benefits in placement area. Slightly reduced maintenance dredging costs.
CULTURAL RESOURCES	No effect.	No effect anticipated.
RECREATION	No effect.	Temporary disturbance due to outfall construction.
AESTHETICS	No effect.	Booster pump housing would have minor impact. Minor short-term adverse impact due to construction.
NOISE	No effect.	Booster pump would be minimally compliant with local codes.

3 AFFECTED ENVIRONMENT

The Affected Environment section succinctly describes the existing environmental resources of the areas that would be affected if any of the alternatives were implemented. This section describes only those environmental resources that are relevant to the decision to be made. It does not describe the entire existing environment, but only those environmental resources that would affect or that would be affected by the alternatives if they were implemented. This section, in conjunction with the description of the "no-action" alternative forms the base line conditions for determining the environmental impacts of the proposed action and reasonable alternatives.

3.1 GENERAL ENVIRONMENTAL SETTING

Lake Worth Inlet is a Federally maintained inlet and deepwater port located on the Atlantic Ocean in Palm Beach County, Florida. This is the northernmost of two inlets connecting Lake Worth with the Atlantic Ocean and serves as the entrance to the Port of Palm Beach or Palm Beach Harbor. Efforts to construct the inlet in its present day location were initiated by local interests in 1918, followed by the installation of rock jetties in 1925. During the periods of 1935 and 1939, the jetties were rebuilt and extended to a length of approximately 2,000 feet. The Corps, since 1934, has maintained the Palm Beach Harbor navigation project which includes the jetty structures, channel, turning basin, inlet revetments and a settling basin located north of the entrance channel. The existing STP was built in 1958 and is located just north of the inlet. The current discharge point or outfall for the plant is approximately 200 feet south of the south jetty.

3.2 FEDERALLY THREATENED AND ENDANGERED SPECIES

3.2.1 SEA TURTLES

The loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*), and Kemp's ridley (*Lepidochelys kempii*) sea turtles can occur within the coastal waters near the project area (Dodd 1992; Ogren 1992; Meylan 1992; Ehrhart 1992; Pritchard 1992). All of these species are Federally endangered except the loggerhead, which is classified as threatened. The loggerhead, green, and leatherback, are known to nest within the beach placement area. Loggerheads have nested in Palm Beach County as early as April 16 and as late as September 27. Green sea turtle nests have been observed as early as May 14 and as late as August 15, while leatherback nests have been recorded as early as March 15 and as late as July 16 for the county (Applied Technology and Management, Inc., 1995; Florida Fish and Wildlife Conservation Commission 2004). Table 2 lists the number of sea turtle nests recorded by Palm Beach County for the beach placement area.

TABLE 2. SEA TURTLE NESTING DATA FOR BEACH PLACEMENT AREA SOUTH OF SOUTH JETTY (R-76 TO R-79), PALM BEACH COUNTY.

YEAR	LOGGERHEAD			GREEN			LEATHERBACK		
	Nests	False Crawls	Nesting Success	Nests	False Crawls	Nesting Success	Nests	False Crawls	Nesting Success
2004	132	169	0.44	1	0	1.00	2	0	1.00
2003	100	233	0.30	1	0	1.00	5	1	0.83
2002	122	171	0.42	2	2	0.50	4	0	1.00
2001	193	NA	0.47	0	NA	0	18	NA	0.95
2000	226	NA	0.28	2	NA	0.29	3	NA	0.75
1999	303	NA	0.43	0	NA	0	3	NA	0.75
1998	198	NA	0.36	3	NA	0.75	1	NA	0.33
1997	199	NA	0.49	0	NA	0	6	NA	0.75
1996	277	NA	0.41	1	NA	0.33	2	NA	0.40
MEAN	194.4	191	0.44	1.11	0.66	0.43	4.9	0.33	0.75

NA=not available Source of Data: Palm Beach County

3.2.2 WEST INDIAN MANATEE

The West Indian manatee (*Trichechus manatus*), a Federally endangered species, is known to congregate during cold periods in the winter months near the Rivera Beach Florida Power and Light Company power plant located at the southern extreme of the turning basin on the western shore of Lake Worth. Hundreds of manatees have been observed in the vicinity of the plant during cold weather (USFWS 1993).

3.3 SHORELINE STABILITY

Presently, shoreline change north of Lake Worth Inlet is governed by seasonal operation of the STP and by the dominant physical processes in the inlet's vicinity (i.e. local wave climate and tidal activity). Sand that is not captured and transferred by the sand bypassing plant impounds against the north jetty and migrates into the existing settling basin. From December 1990 to February 1993 the entire existing settling basin experienced significant deposition. Sediment "spilled" out of the basin and deposited in the navigation channel. Between February 1993 and June 1993 the basin continued to shoal and more material deposited in the channel. The shoaling rate for the channel and basin from January 1992 and June 1993 was approximately 93,000 cy/yr, marking a period of increased major storm activity. While it appears that the existing settling basin is adequate for normal transport it does not have enough capacity for peak transport associated with storm events.

3.4 ESSENTIAL FISH HABITAT

3.4.1 ESTUARINE/INSHORE HABITAT

The inshore habitat in the vicinity of the STP and outfall area is not vegetated and has an extremely dynamic sandy substrate. Diverse communities of haustoriid and other amphipod groups, Donax, Tellina, gastropods, polychaetes, burrowing callinassid shrimps, as well as a variety of fishes are typically found within this habitat type along

the east coast of Florida (Spring 1981; Gorzelany 1983; Peters and Nelson 1987; Nelson and Collins 1987). Managed species that may occur within the project area include various life stages of penaeid shrimp, red drum, the snapper-grouper complex, and coastal migratory pelagic fishes (South Atlantic Fishery Management Council 1998).

3.4.2 HARD BOTTOM HABITAT

Hard bottoms do not occur immediately north of Lake Worth Inlet (Applied Technology and Management, Inc., 1995). However, hard bottom habitat colonized by sponges and soft corals can be found along the walls of the entrance channel (Corps 1998). Surveys south of the inlet, between DNR Monuments R-76 and R-83, indicated that hard bottom communities are much more prevalent south of R-79. Commonly encountered organisms included red boring sponge (*Cliona sp.*), red algae (*Meristiella echiocarpum*), and the tube building annelid *Phragmatopoma lapidosa*. Hard bottom habitat significantly declines between R-76 and R-79. The only hard bottom habitat observed within this area was directly associated with the south jetty, a small section (27 square feet) of uncolonized exposed rock north of R-77, a small area of exposed rock in the intertidal region 350 feet north of R-78, and a lone outcropping of rock located midway between R-78 and R-79 (Applied Technology and Management, Inc., 1995). These areas, like the ones previously described, are comprised of calcareous rock of the Anastasia formation.

3.5 MIGRATORY BIRDS

Common shorebird and larid species such as black-bellied plover (*Pluvialis squatarola*), sanderling (*Caladris alba*), willet (*Catoptrophorus semipalmatus*), laughing gull (*Larus atricilla*), ring-billed gull (*Larus delawarensis*), and royal tern (*Sterna maxima*) have been observed feeding and resting in the project area. There are local records of least terns (*Sterna antillarum*) nesting near the south jetty, but not in recent years.

3.6 VEGETATION

Much of the beach/dune ecosystem in the project area has been altered by development. Structures such as seawalls and bulkheads have reduced a significant amount of the vegetation that would naturally occur here (Applied Technology and Management, Inc., 1995). Native plants including sea grape (*Coccoloba uvifera*), sea oats (*Uniola paniculata*), and other species can still be observed in the upper beach zone of a portion of the project area.

3.7 WATER QUALITY

3.7.1 WATER COLUMN

The waters adjacent to the project area are classified by the state of Florida as Class III waters, suitable for recreation as well as propagation and maintenance of a healthy and well-balanced population of fish and wildlife.

3.7.2 SEDIMENT

Geo-technical analysis indicates that bypassed sand in the past has been beach quality with less than 10% silt.

3.8 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE

There are no known sources of hazardous, toxic, or radioactive wastes in the project area.

3.9 NAVIGATION

In 2004, commercial vessels in and out of Palm Beach Harbor made a total of 2,945 inbound and outbound trips. These vessels transported 4,147,000 short tons of freight that included petroleum products, chemicals, crude materials, manufactured goods, food and farm products, and manufactured equipment (Waterborne Commerce of the United States 2004).

3.10 ECONOMICS

Placement of sand along the beach south of the south jetty provides shore protection benefits to the local community. The transport of commercial freight in and out of the harbor provides a significant stimulus to the regional economy. Also, the port provides employment and generates income for the local community through the purchase of goods and services.

3.11 CULTURAL RESOURCES

The Sand Transfer Plant is less than 50 years old and is not eligible for inclusion on the National Register of Historic Places. The discharge pipe extension will be excavated in an area that is covered by beach renourishment fill; as such there is minimal potential for significant cultural resources to be affected by the project.

3.12 RECREATION

Privately owned vessels utilize Lake Worth Inlet in order to access the Atlantic Ocean, Lake Worth, and the Intracoastal Waterway. Beach access is somewhat limited due to the predominance of private property found in this vicinity.

3.13 AESTHETICS

The Lake Worth Inlet is man-made and development associated with the harbor facilities has impacted the aesthetics of the area. Also, numerous private residences and commercial businesses have been constructed along the inlet and the adjacent beach areas.

3.14 NOISE

Land use immediately west of the STP and beach placement area has been zoned residential. Background noise from the Port and nearby roadways appears to be minimal.

4 ENVIRONMENTAL EFFECTS

This section is the scientific and analytic basis for the comparisons of the alternatives. See Table 1 in Section 2.0 Alternatives, for summary of impacts. The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects.

4.1 THREATENED AND ENDANGERED SPECIES

4.1.1 SELECTED PLAN

Pursuant to Section 7 of the Endangered Species Act, coordination with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) in regards to this project is on-going. The Corps has determined that the proposed action may affect nesting sea turtles and may affect, but is not likely to adversely affect, the West Indian manatee. These species fall under the jurisdiction of the USFWS. The Corps' final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the USFWS and NMFS.

4.1.1.1 Sea Turtles

Construction activities including the installation of the second discharge point and permanent booster pump as well as material compaction after the proposed action is completed may adversely impact sea turtle nesting success. In order to minimize this impact, the following measures would be implemented:

- The second discharge point and permanent booster pump would be constructed outside the primary sea turtle nesting season (May 1 through October 31). If construction activities were to occur outside this time frame but still within the potential sea turtle nesting season, i.e. March 1 to May 1 and November 1 through November 30, sea turtle monitoring and relocation would be performed in accordance with the Biological Opinion (B.O.) of the USFWS.
- Compaction monitoring would be carried out. Beach tilling, if necessary, would be performed pursuant to the B.O. of the USFWS.

4.1.1.2 West Indian Manatee

Protective measures would be taken to ensure the safety of manatees when waterborne workboats are used. To make the contractor and his personnel aware of the potential presence of this species in the project area, their endangered status, and the need for precautionary measures, the contract specifications would include the following standard manatee protection clauses:

- The contractor would instruct all personnel associated with construction activities about the potential presence of manatees in the area and the need to avoid collisions with them.

- If a manatee were sighted within 100 yards of the project area, all appropriate precautions would be implemented by the contractor to ensure protection of the manatee. These precautions would include the operation of all moving equipment no closer than 50 feet of a manatee. If a manatee were closer than 50 feet to moving equipment or the project area, the equipment would be shut down and all construction activities would cease to ensure protection of the manatee. Construction activities would not resume until the manatee has departed the project area.
- All vessels associated with the project would operate at 'no wake' speeds at all times while in shallow waters or channels where the draft of the boat provides less than three feet clearance from the bottom. Boats used to transport personnel would be shallow draft vessels, preferably of the light-displacement category, where navigational safety permits. Vessels transporting personnel between the landing and any workboat would follow routes of deep water to the greatest possible extent. Shore crews would use upland road access if available.
- All personnel would be advised that there are civil and criminal penalties for harming, harassing, or killing manatees, which are protected under the Endangered Species Act and the Marine Mammal Protection Act.

4.1.2 NO ACTION ALTERNATIVE (STATUS QUO)

Bypassing events, maintenance dredging and beach placement rates should remain the same. No additional impacts to sea turtle nesting would be anticipated.

4.2 SHORELINE STABILITY

4.2.1 SELECTED PLAN

Bypassing of material from the STP to the beach placement area would continue to provide shore protection benefits. Discharge of material south of the nodal point is expected to minimize material returning to the inlet area.

4.2.2 NO ACTION ALTERNATIVE (STATUS QUO)

Current rates of erosion of the shoreline, shoaling or accumulation of sand within the inlet, and maintenance dredging would continue.

4.3 ESSENTIAL FISH HABITAT

4.3.1 SELECTED PLAN

The proposed action would not have a substantial adverse impact on Essential Fish Habitat (EFH) or Federally managed fisheries along the eastern coast of Florida. The current rate of maintenance dredging may slightly decline and may result in less adverse impacts to EFH over time.

4.3.2 NO ACTION ALTERNATIVE (STATUS QUO)

The current rate of maintenance dredging would continue.

4.4 MIGRATORY BIRDS

4.4.1 SELECTED PLAN

No adverse impacts to migratory birds are anticipated. However, if any construction were performed from April 1 to August 31, the Corps' standard migratory bird protection plan would be implemented.

4.4.2 NO ACTION ALTERNATIVE (STATUS QUO)

There would be no effect to migratory birds if the no action alternative were selected.

4.5 VEGETATION

4.5.1 SELECTED PLAN

The proposed action should have no adverse effects on vegetation, but may help prevent erosion and preserve vegetation found in the upper beach.

4.5.2 NO ACTION ALTERNATIVE (STATUS QUO)

There would be no effect to vegetation cover. Continued placement of dredged material on the beach south of the inlet should also help prevent the beach from eroding away and adversely affecting the plant community.

4.6 WATER QUALITY

4.6.1 SELECTED PLAN

There should be no effect to water quality as construction activities should be confined to the STP and above mean high water at the beach placement area. If necessary, turbidity would be monitored according to State protocols during the proposed construction work. According to the state of Florida's water quality standards, turbidity levels during construction activities are not to exceed 29 nephelometric turbidity units (NTUs) above background levels within a 150 meter mixing zone. If at any time the turbidity standard were exceeded, those activities causing the violation would cease. Future maintenance dredging should decline.

4.6.2 NO ACTION ALTERNATIVE (STATUS QUO)

Maintenance dredging and beach placement rates should remain the same.

4.7 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

4.7.1 SELECTED PLAN

There are no known sources of hazardous, toxic, or radioactive wastes in the project area. However, the site would be re-mediated in the event contaminants were unexpectedly found during construction.

4.7.2 NO ACTION ALTERNATIVE (STATUS QUO)

There are no known sources of hazardous, toxic, or radioactive wastes in the project area.

4.8 NAVIGATION

4.8.1 SELECTED PLAN

Implementation of the selected plan would provide a minor long-term benefit to deep draft vessels by reducing shoaling, or the amount of sandy material which accumulates within the inlet.

4.8.2 NO ACTION ALTERNATIVE (STATUS QUO)

There would be a slightly increased risk to vessels, especially deep draft vessels, due to increased shoaling within the entrance channel if the no action alternative were selected.

4.9 ECONOMICS

4.9.1 SELECTED PLAN

Bypassing material to the beach south of the inlet provides shore protection benefits. There would be a minor long-term benefit to the regional economy by helping maintain the authorized depth of the inlet or entrance channel to the Port of Palm Beach. The proposed action would reduce maintenance dredging costs.

4.9.2 NO ACTION ALTERNATIVE (STATUS QUO)

Bypassing would continue at the current rate and maintenance dredged material would also continue to be placed on the beach south of the inlet. There would be a minor long-term adverse impact to the regional economy due to increased shoaling of the inlet. Not performing the proposed action may also result in increased maintenance dredging costs.

4.10 CULTURAL RESOURCES

4.10.1 SELECTED PLAN

There are no cultural resources recorded in the project area, additionally the Corps determined that because of the location and nature of the project there is little to no potential for significant cultural resources to be affected. As such, a determination of no potential to affect has been made. In accordance with the procedures contained in 36CFR800 the Florida State Historic Preservation Officer concurred with the Corps determination (December 2, 2003, DHR Number 2003-9860).

4.10.2 NO-ACTION ALTERNATIVE (STATUS QUO)

There would be no impact to cultural resources if the proposed actions were not constructed.

4.11 RECREATION

4.11.1 SELECTED PLAN

Recreation activities would be temporarily displaced during construction within the project area.

4.11.2 NO ACTION ALTERNATIVE (STATUS QUO)

There would be no effect to recreational opportunities if the proposed actions were not constructed.

4.12 AESTHETICS

4.12.1 SELECTED PLAN

There would be a minor short-term adverse impact to the aesthetic quality of the area due to the presence of construction equipment and materials. The housing for the permanent booster pump would have a pleasing design and not have external lights.

4.12.2 NO ACTION ALTERNATIVE (STATUS QUO)

There would be no effect to the aesthetics of the area if the proposed actions were not constructed.

4.13 NOISE

4.13.1 SELECTED PLAN

The booster pump would have an electric motor with a decibel level not exceeding local code requirements (55 dBA).

4.13.2 NO ACTION ALTERNATIVE (STATUS QUO)

There would be no increased levels of noise if the proposed actions were not constructed.

4.14 CUMULATIVE IMPACTS

Cumulative impact is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). The following are completed Federal navigation projects and/or authorizations for subsequent work at Lake Worth Inlet:

- 1918, local entities created Lake Worth Inlet.
- 1934, maintenance of improvements previously constructed by local interests.
- 1934, deepening the channels and turning basin to 20 feet.

- 1935, authorized work previously approved by the Public Works Act program and restoration of jetties, removal of south point, revetment of banks, widening of channels, and enlargement of turning basin.
- 1945, deepening the channels and turning basin to 25 feet.
- 1950, extending turning basin southward 550 feet.
- 1960, deepening channels to 35 feet and enlarging turning basin.
- 1986, maintenance of locally expanded turning basin to depth of 25 feet on north side of existing basin.

The amount of material bypassed south of the inlet has averaged 163,875 cubic yards between 1996 and 2005 (please see Table 3).

Table 3. Pumping History of STP (1996-2005)

Fiscal Year	Quantity Pumped (Cubic Yards)
1996	92,165
1997	227,500
1998	66,125
1999	64,500
2000	220,250
2001	219,750
2002	232,000
2003	157,125
2004	188,125
2005	171,250
Average	163,875

These actions have resulted in the regular disturbance of marine ecosystems in the vicinity of Palm Beach Harbor, both estuarine/inshore and beach habitats. However, these actions as well as the currently proposed project have also significantly reduced the amount of shoaling in the harbor's channel. This has resulted in less maintenance dredging which in turn has reduced adverse cumulative environmental impacts associated with more frequent dredging events.

4.15 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

4.15.1 IRREVERSIBLE

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. There would be no permanent loss of resources other than the consumption of materials necessary for construction of the project.

4.15.2 IRRETRIEVABLE

An irretrievable commitment of resources is one in which, due to decisions to manage the resource for another purpose, opportunities to use or enjoy the resource as they presently exist are lost for a period of time. Benthic organisms within the project area would be temporarily lost due to construction but are expected to recover within one year.

4.16 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

There would be an unavoidable temporary increase in turbidity levels limited to the waters adjacent to the various construction activities. As previously stated, benthic organisms within the project area would be temporarily lost due to construction but are expected to recover within one year.

4.17 ENVIRONMENTAL COMMITMENTS

The U.S. Army Corps of Engineers and contractors agree to avoiding, minimizing or mitigating for adverse effects during construction activities by including the following commitments in the contract specifications:

1. All terms and conditions set out in the Biological Opinion (B.O.) of the USFWS for those Federally endangered or threatened species identified in this Environmental Assessment would be implemented. Most importantly, the second discharge point, pipeline, and permanent booster pump would be constructed outside the primary sea turtle nesting season (May 1 through October 31). If construction activities were to occur outside this time frame but still within the potential sea turtle nesting season, i.e. March 1 to May 1 and November 1 through November 30, sea turtle monitoring and relocation would be performed in accordance with the B.O. Compaction monitoring and, if necessary, beach tilling would be performed pursuant to the B.O.
2. The standard manatee protection measures would be implemented for the duration of the project.
3. The standard migratory bird protection measures would also be implemented, if necessary.
4. All project activities would be in compliance with applicable water quality standards of the Water Quality Certification to be issued by the state of Florida.
5. The contractor would establish and maintain quality control for environmental protection of all items set forth in the project plans and specifications. The contractor would record on daily quality control reports or attachments thereto, any problems in complying with laws, regulations and ordinances, and corrective action taken.
6. The contracting officer would notify the contractor in writing of any observed noncompliance with Federal, State, or local laws or regulations, permits and other elements of the contractor's Environmental Protection Plan. The contractor would, after receipt of such notice, inform the contracting officer of proposed corrective action and take such action as may be approved. If the contractor fails to comply promptly, the contracting officer would issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions would be granted or costs or damages allowed to the contractor for any such suspension.
7. The contractor would train his personnel in all phases of environmental protection. The training would include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities to insure adequate and continuous environmental pollution control. Quality control and supervisory personnel would be thoroughly trained in the proper use of monitoring devices and abatement equipment, and would be thoroughly knowledgeable of Federal, State, and local laws, regulations, and permits as listed in the Environmental Protection Plan submitted by the contractor.

8. The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract would be protected during the entire period of this contract. The contractor would confine his activities to areas defined by the drawings and specifications.

9. As stated in the standard contract specifications, the disposal of hazardous or solid wastes would be in compliance with Federal, State, and local laws. A spill prevention plan would also be required.

4.18 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

4.18.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

Environmental information on the project has been compiled and this draft Environmental Assessment (EA) has been prepared. A Preliminary Finding of No Significant Impact was prepared and shall be coordinated with the public. The project will be in full compliance with the National Environmental Policy Act prior to construction.

4.18.2 ENDANGERED SPECIES ACT OF 1973

Consultation with the NMFS and the USFWS is on-going (see Appendix C). This project will be in full compliance with the Act.

4.18.3 FISH AND WILDLIFE COORDINATION ACT OF 1958

A Coordination Act Report (CAR) is not required for this project. However, if authorization is required for this project, then a CAR will also be required. This project will be in full compliance with the Act.

4.18.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966 (INTER ALIA)

(PL 89-665, the Archeology and Historic Preservation Act (PL 93-291), and executive order 11593) Archival research, and consultation with the State Historic Preservation Officer (SHPO), have been conducted in accordance with the National Historic Preservation Act, as amended; the Archeological and Historic Preservation Act, as amended and Executive Order 11593. The project would have no effect on cultural resources and is in compliance with these Acts.

4.18.5 CLEAN WATER ACT OF 1972

Pursuant to Section 401 of the Clean Water Act, the proposed actions would be performed in full compliance with State water quality statutes. The local sponsor has agreed to obtain the necessary permit from the Florida Department of Environmental Protection (DEP). The DEP by letter dated September 22, 2003, has stated that they do not object to this project. In accordance with the Coastal Zone Management Act, the proposed maintenance would also be reviewed by the State in order to determine if the

project is consistent with the Coastal Zone Management Plan. This review is performed concurrently with the issuance of the water quality certification or permit.

4.18.6 CLEAN AIR ACT OF 1972

No air quality permits would be required for this project.

4.18.7 COASTAL ZONE MANAGEMENT ACT OF 1972

A Federal consistency determination in accordance with 15 CFR 930 Subpart C is included in this report as Appendix B. A State consistency determination is anticipated.

4.18.8 FARMLAND PROTECTION POLICY ACT OF 1981

No prime or unique farmland would be impacted by implementation of this project. This Act is not applicable.

4.18.9 WILD AND SCENIC RIVER ACT OF 1968

No designated Wild and Scenic river reaches would be affected by project related activities. This Act is not applicable.

4.18.10 MARINE MAMMAL PROTECTION ACT OF 1972

Incorporation of the safe guards used to protect threatened or endangered species during construction activities would also protect any marine mammals in the area; therefore, this project will be in compliance with the Act.

4.18.11 ESTUARY PROTECTION ACT OF 1968

No designated estuary would be affected by project activities. This Act is not applicable.

4.18.12 FEDERAL WATER PROJECT RECREATION ACT

This Act is not applicable to this project.

4.18.13 FISHERY CONSERVATION AND MANAGEMENT ACT OF 1976

The project shall be coordinated with the National Marine Fisheries Service (NMFS) and will be in full compliance with the Act.

4.18.14 SUBMERGED LANDS ACT OF 1953

The project would not occur on submerged lands of the State of Florida. The project shall be coordinated with the State and shall be in full compliance with the Act.

4.18.15 COASTAL BARRIER RESOURCES ACT AND COASTAL BARRIER IMPROVEMENT ACT OF 1990

There are no designated coastal barrier resources in the project area that would be affected by this project. These Acts are not applicable.

4.18.16 RIVERS AND HARBORS ACT OF 1899

The proposed work would not obstruct navigable waters of the United States. The proposed action shall be subject to the public notice, public hearing, and other evaluations normally conducted for activities subject to the Act. The project shall be in full compliance with the Act.

4.18.17 ANADROMOUS FISH CONSERVATION ACT

Anadromous fish species would not be affected. The project shall be coordinated with the National Marine Fisheries Service and shall be in full compliance with the Act.

4.18.18 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

The Corps' standard migratory bird protection plan would be implemented, if required. The project shall be in full compliance with these Acts.

4.18.19 MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT

The term "dumping" as defined in the Act (33 U.S.C. 1402(f)) does not apply to bypassed material or to disposal of material for beach nourishment or to the placement of material for a purpose other than disposal (i.e. placement of rock material as an artificial reef or the construction of artificial reefs as mitigation). Therefore, the Marine Protection, Research and Sanctuaries Act does not apply to this project. The disposal activities addressed in this EA have been evaluated under Section 404 of the Clean Water Act.

4.18.20 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

This project shall be coordinated with NMFS and shall be in full compliance with this Act.

4.18.21 E.O. 11990, PROTECTION OF WETLANDS

No wetlands would be affected by project activities. This project is in compliance with the goals of this Executive Order.

4.18.22 E.O. 11988, FLOOD PLAIN MANAGEMENT

This project would have no adverse impacts to flood plain management.

4.18.23 E.O. 12898, ENVIRONMENTAL JUSTICE

The proposed action would not result in adverse human health or environmental effects. Any impacts of the action would not be disproportionate towards any minority. The activity does not (a) exclude persons from participation in, (b) deny persons the benefits of, or (c) subject persons to discrimination because of their race, color, or national origin. The activity would not impact “subsistence consumption of fish and wildlife.”

4.18.24 E.O. 13089, CORAL REEF PROTECTION

Adverse impacts to coral reefs are not anticipated.

4.18.25 E.O. 13112, INVASIVE SPECIES

The proposed action would have no impact on invasive species.

5 LIST OF PREPARERS

PREPARERS

Preparer	Discipline	Role
Paul Stodola, U.S. Army Corps of Engineers	Biologist	Principal Author
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Lori Hadley, U.S. Army Corps of Engineers	Engineer	Shoreline Stability
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REVIEWERS

Personnel in the Planning Division of the U.S. Army Corps of Engineers, Jacksonville District, reviewed this draft Environmental Assessment.

6 PUBLIC INVOLVEMENT

6.1 SCOPING AND DRAFT EA

A Public Notice was issued 31 October 2002 and on 16 August 2006 to the appropriate parties.

6.2 COMMENTS RECEIVED AND RESPONSE

Letters received during the Public Notice period and responses shall be provided in Appendix C.

REFERENCES

- Applied Technology and Management. 1995. Lake Worth Inlet Management Plan, Phase III, Environmental Evaluations *prepared for the* Town of Palm Beach.
- Dodd, C.K. 1992. Loggerhead sea turtle. Pages 128-134 in P. Moler and R. Ashton, editors. Rare and Endangered Biota of Florida:Volume III. Amphibians and Reptiles. University Press of Florida, Gainesville, Florida.
- Ehrhart, L.M. 1992. Green sea turtle. Pages 90-94 in P. Moler and R. Ashton, editors. Rare and Endangered Biota of Florida:Volume III. Amphibians and Reptiles. University Press of Florida, Gainesville, Florida.
- Florida Fish and Wildlife Conservation Commission. 2004. Sea turtle nests data base.
- Gorzelay, J.F. 1983. The effects of beach nourishment on the nearshore benthic macrofauna of Indian River and Melbourne Beach, Florida. MS Thesis, Florida Institute of Technology, Melbourne, FL, USA, 1983.
- Meylan, A. 1992. Hawksbill sea turtle. Pages 95-99 in P. Moler and R. Ashton, editors. Rare and Endangered Biota of Florida:Volume III. Amphibians and Reptiles. University Press of Florida, Gainesville, Florida.
- Mid-Atlantic Technology and Environmental Research, Inc. Castle Hayne, NC. 2001a. Cultural Resources Remote Sensing Survey of Channel Improvements to the Intracoastal Waterway and Palm Beach Harbor, Palm Beach County, Florida.
- Mid-Atlantic Technology and Environmental Research, Inc. Castle Hayne, NC. 2001b. Archeological Diver Identification and Evaluation of Nineteen Potentially Significant Submerged Targets along the Intracoastal Waterway, Palm Beach County, Florida.
- Nelson, W.G. and G.W. Collins. 1987. Effects of beach renourishment on the benthic macrofauna and fishes of the nearshore zone of Sebastian Inlet State Recreation Area. U. S. Army Corps of Engineers.
- Ogren, L.H. 1992. Atlantic Ridley sea turtle. Pages 100-104 in P. Moler and R. Ashton, editors. Rare and Endangered Biota of Florida:Volume III. Amphibians and Reptiles. University Press of Florida, Gainesville, Florida.
- Peters, D.J. and Nelson, W.G. 1987. The seasonality and spatial patterns of juvenile surf fishes of the Florida east coast. Florida Science 50:85-89.

Pritchard, P.C. 1992. Leatherback sea turtle. Pages 214-218 in P. Moler and R. Ashton, editors. Rare and Endangered Biota of Florida: Volume III. Amphibians and Reptiles. University Press of Florida, Gainesville, Florida.

South Atlantic Fishery Management Council. 1998. Habitat plan for the South Atlantic region: essential fish habitat requirements for fishery management plans of the South Atlantic Fishery Management Council.

Spring, K.D. 1981. A study of spatial and temporal variation in the nearshore macrobenthic populations of the central Florida east coast. Masters Thesis. Florida Institute of Technology, Melbourne, FL.

Tate, S. 2004. Town of Palm Beach. Sea turtle data.

U.S. Army Corps of Engineers. 1996. Environmental impact statement, Coast of Florida Erosion and Storm Effects Study Region III, Palm Beach, Broward and Dade Counties, Florida.

U.S. Army Corps of Engineers. 1998. Environmental assessment, maintenance dredging, Palm Beach Harbor, Palm Beach County, Florida.

U.S. Army Corps of Engineers. 2000. Waterborne commerce of the United States, Part 1-waterways and harbors Atlantic coast.

U.S. Army Corps of Engineers. 2001. Draft environmental assessment, Section 107 small navigation project, Palm Beach Harbor-Lake Worth access channel expansion, Palm Beach County, Florida.

U.S. Fish and Wildlife Service. 1993. Biological opinion for maintenance dredging at Palm Beach Harbor, Palm Beach County, Florida.

APPENDIX A - SECTION 404(B) EVALUATION

SECTION 404(b) EVALUATION

SAND TRANSFER PLANT REHABILITATION AND ADDITION OF SECOND DISCHARGE POINT AND PERMANENT BOOSTER PUMP LAKE WORTH INLET PALM BEACH COUNTY, FLORIDA

I. Project Description

a. Location. The sand transfer plant (STP) is located immediately north of Lake Worth Inlet within Palm Beach County, Florida.

General Description. The proposed plan calls for rehabilitating the STP as well as constructing a second discharge point and permanent booster pump.

c. Authority and Purpose. The Public Works Act (PWA) Program of 13 March 1934 (House Document 185/73/2) authorized the maintenance of improvements previously constructed by local interests at Palm Beach Harbor. Section 101(b) (8) of the Water Resources Development Act (WRDA) of 1996, authorized a project for mitigation of shoreline erosion and storm damages caused by existing federal navigation improvements. The purpose of this project is to rehabilitate the STP and improve its bypass efficiency as well as construct a second discharge point and permanent booster pump which will place bypassed material at an adequate distance from the inlet.

d. General Description of Fill/Construction Material.

(1) General Characteristics of Material. Beach quality sand would be bypassed by the STP. Also, beach sand would be excavated in order to install the second discharge point.

(2) Quantity of Material. Approximately 160,000 cubic yards per year would be bypassed per year. The pipeline would not exceed 12 inches in diameter and would extend 2,500 feet south of the inlet.

(3) Source of Material. Bypassed material would come from the settling basin immediately north of the north jetty. Beach sand would be excavated from the pipeline trench and then used to backfill the trench.

e. Description of the proposed disposal and construction sites.

(1) Location. The sand transfer plant is located immediately north of the inlet and the discharge is located on the beach south of the inlet. The permanent booster pump would be built within the Federal easement along the south side of the south jetty.

(2) Size. Rehabilitation of the STP would occur within the existing footprint, with possible temporary storage of materials on the beach. The pipeline to the second discharge point would be 2,500 feet in length. It would start at the existing discharge point, located 200 feet south of the south jetty, and proceed south. The permanent booster pump would be approximately 20 X 40 feet in size.

(2) Type of Site. The construction sites are above mean high water on the beach.

(3) Type of Habitat. The beach is open and unvegetated.

(4) Timing and Duration of construction. The proposed activity would occur outside the May 1 to October 31 sea turtle nesting period.

f. Access to Construction Site. Access to the construction sites could be either over land or by barge.

II. Factual Determinations

a. Physical Substrate Determinations.

(1) Substrate Elevation and Slope. The substrate elevation lies above high water.

(2) Type of Fill Material. Pipeline trench would be backfilled with excavated beach sand.

(3) Fill Material Movement. Backfill material would be subject to erosion by waves. STP structure would be of long duration.

(4) Physical Effects on Benthos. Benthic organisms that are not mobile and are located within the footprint of the construction area would be buried or displaced. These areas should be re-colonized soon after project completion.

b. Water Circulation, Fluctuation and Salinity Determination.

(1) Water Column Effects. While unlikely, construction activities may cause a temporary and minor increase in turbidity. Similar projects constructed in the past did not exceed the State turbidity standards.

(2) Current Patterns and Circulation. Currents in the project area are both tidal and longshore. The project would have no significant effect on existing current patterns, current flow, velocity, stratification, or the hydrologic regime in the area.

(3) Normal Water Level Fluctuations and Salinity Gradients. The proposed action would not affect normal tide fluctuations or salinity.

c. Suspended Particulate/Turbidity Determinations.

(1) Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site. While unlikely, construction activities may cause a temporary and minor increase in turbidity. Similar projects constructed in the past did not exceed the State turbidity standards.

(2) Effects on the Chemical and Physical Properties of the Water Column.

(a) Light Penetration. It is unlikely that the proposed actions would cause a decrease in light penetration. If it does, this effect would be temporary, limited to the immediate area of construction and would have no adverse impact on the environment.

(b) Dissolved Oxygen. Dissolved oxygen levels would not be altered by this project.

(c) Toxic Metals, Organics, and Pathogens. No toxic metals, organics, or pathogens are expected to be released as a result of the project.

(d) Aesthetics. While unlikely that the project would cause any turbidity of the water column, if it does this would be a short-term and minor change.

(3) Effects on Biota.

(a) Primary Productivity and Photosynthesis. The proposed action would not have a significant impact on primary productivity.

(b) Suspension/Filter Feeders. It is unlikely that the project would cause any turbidity. If it does, the impact would be temporary and minor.

(c) Sight Feeders. No significant impacts on these organisms are.

d. Contaminant Determinations. The proposed action would not introduce, relocate, or increase contaminants.

e. Aquatic Ecosystem and Organism Determinations.

(1) Effects on Plankton. No adverse impacts on plankton are expected.

(2) Effects on Benthos. No adverse long-term impacts to benthic organisms are expected.

(3) Effects on Nekton. No adverse long-term impacts to nektonic organisms are expected.

(4) Effects on the Aquatic Food Web. No adverse long-term impacts to any trophic level is expected.

(5) Effects on Special Aquatic Sites.

(a) Hardground and Coral Reef Communities. Adverse impacts to hardground or coral reef communities are not anticipated.

(b) Sanctuaries and Refuges. The proposed action would not adversely impact any sanctuary or refuge.

(c) Wetlands. The proposed action would not adversely impact any wetlands.

(d) Mud Flats. The proposed action would not adversely impact any mud flats.

(e) Vegetated Shallows. The proposed action would not adversely impact any vegetated shallows.

(f) Riffle and Pool Complexes. The proposed action would not adversely impact any riffle or pool complexes.

(6) Endangered and Threatened Species. There would be no significant adverse impacts on any endangered or threatened species or on any critical habitat of any endangered or threatened species.

(7) Other Wildlife. The proposed action would not significantly adversely affect any other wildlife species.

(8) Actions to Minimize Impacts. All practical safeguards would be taken during construction to preserve and enhance environmental, aesthetic, recreational, and economic values in the project area.

f. Proposed Construction Site Determinations.

(1) Mixing Zone Determination. Construction activities would not cause unacceptable changes in the mixing zone water quality requirements as specified by the state of Florida's Water Quality Certification permit procedures.

(2) Determination of Compliance with Applicable Water Quality Standards. Due to the nature of the materials to be used and type of construction, Class III water quality standards would not be violated.

(3) Potential Effects on Human Use Characteristics.

(a) Municipal and Private Water Supplies. The proposed action would not impact municipal and private water supplies.

(b) Recreational and Commercial Fisheries. The proposed action would not impact recreation and commercial fisheries.

(c) Water Related Recreation. The proposed action would temporarily impact water related recreation.

(d) Aesthetics. The proposed action would temporarily impact aesthetics.

(e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves. No such designated sites area located within the project area.

g. Determination of Cumulative Effects on the Aquatic Ecosystem. There would be no cumulative effects that result in a significant impairment of the existing aquatic ecosystem caused by the proposed action.

h. Determination of Secondary Effects on the Aquatic Ecosystem. There would be no secondary effects on the aquatic ecosystem caused by the proposed action.

III. Findings of Compliance or Non-compliance with the Restrictions on Discharge.

a. No significant adaptations of the guidelines were made relative to this evaluation.

b. No practicable alternative exists which meets the study objectives that does not involve discharge of fill into waters of the United States.

c. After consideration of disposal site dilution and dispersion, the discharge of fill materials will not cause or contribute to, violations of any applicable State water quality standards for Class III waters. The discharge operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

d. The proposed action will not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973, as amended.

e. The placement of fill material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.

f. On the basis of the guidelines, the proposed disposal site for the discharge of dredged material is specified as complying with the requirements of these guidelines.

APPENDIX B - COASTAL ZONE MANAGEMENT CONSISTENCY

**FLORIDA COASTAL ZONE MANAGEMENT PROGRAM
FEDERAL CONSISTENCY EVALUATION PROCEDURES**

**SAND TRANSFER PLANT REHABILITATION AND ADDITION OF SECOND
DISCHARGE POINT AND PERMANENT BOOSTER PUMP
LAKE WORTH INLET
PALM BEACH COUNTY, FLORIDA**

1. Chapter 161, Beach and Shore Preservation. The intent of the coastal construction permit program established by this chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Response: The proposed plans and information will be voluntarily submitted by the U.S. Army Corps of Engineers to the state of Florida.

2. Chapters 163(part II), 186, and 187, County, Municipal, State and Regional Planning. These chapters establish the Local Comprehensive Plans, the Strategic Regional Policy Plans, and the State Comprehensive Plan (SCP). The SCP sets goals that articulate a strategic vision of the State's future. Its purpose is to define in a broad sense, goals, and policies that provide decision-makers directions for the future and provide long-range guidance for an orderly social, economic and physical growth.

Response: The proposed project shall be coordinated with various Federal, State and local agencies during the planning process. The project meets the primary goal of the State Comprehensive Plan through preservation and protection of the shorefront development and infrastructure.

3. Chapter 252, Disaster Preparation, Response and Mitigation. This chapter creates a state emergency management agency, with the authority to provide for the common defense; to protect the public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: The proposed project involves operations and maintenance activities in order to reduce shoaling and provide safer navigation through Lake Worth Inlet. Therefore, this project would be consistent with the efforts of Division of Emergency Management.

4. Chapter 253, State Lands. This chapter governs the management of submerged State lands and resources within state lands. This includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands; mineral resources; unique natural features; submerged lands; spoil islands; and artificial reefs.

Response: Adverse impacts to seagrass beds and reef communities are not anticipated. No wetlands are located within the project area. The proposed project would comply with the intent of this chapter.

5. Chapters 253, 259, 260, and 375, Land Acquisition. This chapter authorizes the State to acquire land to protect environmentally sensitive areas.

Response: No land would be acquired, however easements would be necessary to install the second discharge location and pipeline.

6. Chapter 258, State Parks and Aquatic Preserves. This chapter authorizes the state to manage State parks and preserves. Consistency with this statute would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs, management or operations.

Response: The proposed project area does not contain any State parks or aquatic preserves nor are there any within the immediate vicinity of the project that would be affected. The project shall be consistent with this chapter.

7. Chapter 267, Historic Preservation. This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Response: This project has been coordinated with the State Historic Preservation Officer (SHPO).

8. Chapter 288, Economic Development and Tourism. This chapter directs the State to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: The proposed action would decrease shoaling of Lake Worth Inlet. This would be compatible with tourism for this area and therefore, is consistent with the goals of this chapter.

9. Chapters 334 and 339, Transportation. This chapter authorizes the planning and development of a safe balanced and efficient transportation system.

Response: The proposed action would provide safer navigation through Lake Worth Inlet and therefore is consistent with the goals of this chapter.

10. Chapter 370, Saltwater Living Resources. This chapter directs the State to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in state waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the State engaged in the taking of such resources within or without State waters; to issue licenses for the taking and

processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and, to conduct scientific, economic, and other studies and research.

Response: The proposed action may represent a short-term minor impact to macroinvertebrates on the beach. However, these organisms are highly adapted to the periodic burial by sand in the intertidal zone. These organisms are highly fecund and are expected to return to pre-construction levels within 6 months to one year after construction. No adverse impacts to marine fishery resources are expected. It is not expected that sea turtles would be significantly impacted by this project. Based on the overall impacts of the project, the project shall be consistent with the goals of this chapter.

11. Chapter 372, Living Land and Freshwater Resources. This chapter establishes the Game and Freshwater Fish Commission and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions which provide sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: The project will have no significant effect on freshwater aquatic life or wild animal life.

12. Chapter 373, Water Resources. This chapter provides the authority to regulate the withdrawal, diversion, storage, and consumption of water.

Response: This project does not involve water resources as described by this chapter.

13. Chapter 376, Pollutant Spill Prevention and Control. This chapter regulates the transfer, storage, and transportation of pollutants and the cleanup of pollutant discharges.

Response: The contract specifications will prohibit the contractor from dumping oil, fuel, or hazardous wastes in the work area and will require that the contractor adopt safe and sanitary measures for the disposal of solid wastes. A spill prevention plan will be required.

14. Chapter 377, Oil and Gas Exploration and Production. This chapter authorizes the regulation of all phases of exploration, drilling, and production of oil, gas, and other petroleum products.

Response: This project does not involve the exploration, drilling or production of gas, oil or petroleum product and therefore, this chapter does not apply.

15. Chapter 380, Environmental Land and Water Management. This chapter establishes criteria and procedures to assure that local land development decisions

consider the regional impact nature of proposed large-scale development. This chapter also deals with the Area of Critical State Concern program and the Coastal Infrastructure Policy.

Response: The proposed action will not have any regional impact on resources in the area. Therefore, the project shall be consistent with the goals of this chapter.

16. Chapters 381 (selected subsections on on-site sewage treatment and disposal systems) and 388 (Mosquito/Arthropod Control). Chapter 388 provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the State.

Response: The project shall not further the propagation of mosquitoes or other pest arthropods.

17. Chapter 403, Environmental Control. This chapter authorizes the regulation of pollution of the air and waters of the state by the Florida Department of Environmental Regulation (now a part of the Florida Department of Environmental Protection).

Response: An environmental assessment of project impacts has been prepared. Environmental protection measures will be implemented to ensure that no lasting adverse effects on water quality, air quality, or other environmental resources will occur. The appropriate state permit will be sought by the local sponsor from the State prior to construction. The project complies with the intent of this chapter.

18. Chapter 582, Soil and Water Conservation. This chapter establishes policy for the conservation of the State soil and water through the Department of Agriculture. Land use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop, and utilize soil and water resources both onsite or in adjoining properties affected by the project. Particular attention will be given to projects on or near agricultural lands.

Response: The proposed project is not located near or on agricultural lands; therefore, this chapter does not apply.

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APPENDIX C - PERTINENT CORRESPONDENCE

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